

# PATENT SPECIFICATION

1,014,694

1,014,694



Inventors: STANLEY CHARLES BARNES, ROBERT TREVELYAN  
MATHIESON and JOHN ARMSTRONG.

Date of filing Complete Specification: August 13, 1964.

Application Date: September 6, 1963.

No. 35254/63

Complete Specification Published: December 31, 1965.

© Crown Copyright 1965.

Index at Acceptance:—H1 B (S1A8, S1B1X, S1E1A).

Int. Cl.:—H 01 m 35/18.

## COMPLETE SPECIFICATION

### NO DRAWINGS

### Battery Plates

We, JOSEPH LUCAS (INDUSTRIES) LIMITED, of Great King Street, in the City of Birmingham 19, a British Company, do hereby declare the invention for which we 5 pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to battery plates of the kind manufactured from a lead grid having adhering thereto a paste containing oxides and/or sulphates of lead mixed with a solution of these compounds.

Where the grid of such a battery plate is 15 formed by casting, it is usual to add antimony to the grid to increase its strength. The antimony and lead cannot be perfectly mixed, and consequently the grid will include lead-rich areas and antimony-rich areas. In 20 such plates current tends to flow through the electrolyte in the paste from the lead-rich to the antimony-rich areas with a resultant corrosion of the lead-rich areas to lead oxide or lead sulphate and reduction of oxygen 25 at the antimony-rich areas. This process, which occurs by chance as a result of the presence of the antimony, is found to have an advantageous effect because the lead oxide or lead sulphate produced at the lead-rich areas is firmly secured to the grid and 30 acts as a key for the paste, so improving the adhesion of the paste to the grid. However, in order for the anodic reaction to take place at the lead-rich areas, the corresponding 35 cathodic reaction must take place at the antimony-rich areas. Although the cathodic reaction does take place, it is slow, partly because antimony is not a good catalyst for the reduction of oxygen, and partly because 40 of the time taken for the oxygen to diffuse through the paste.

The object of the invention is to provide a convenient method of manufacturing a

[Price 4s. 6d.]

battery plate in which the reactions described in the preceding paragraph will take place 45 more rapidly, so accelerating the adhesion of paste to the grid. It should be noted that although the theory has been described with reference to cast battery grids, the invention is equally applicable to dispersion- 50 strengthened grids (i.e. grids made from lead with lead oxide dispersed throughout the grid to increase its strength), or other grids which contain no antimony.

A method according to the invention 55 comprises incorporating in the paste a substance which will be reduced in preference to oxygen when the paste is added to the grid.

The invention further resides in a battery 60 plate whenever manufactured by a method as specified in the preceding paragraph.

The substance may take a variety of forms, but preferably a persulphate can be added in proportions of about 1% but in any case 65 less than 3% by weight of the paste to be added to plates which are to be negative or positive in use.

In one example a grid was formed in any convenient known manner and coated with 70 a paste of composition depending on whether a positive or a negative plate was being formed. In either case, 1% by weight of ammonium persulphate was added to the 75 paste. The pasted grid was heated at 180°C for 4 minutes and then left for 72 hours at room temperature, and the adhesion of the paste to the grid was found to be improved as compared with grids coated with standard 80 paste. It was found that increasing the weight of ammonium persulphate to 5% resulted in a plate no better than a standard plate, the maximum proportion of ammonium persulphate being 3% for useful results.

Although ammonium persulphate is the 85 preferred substance for addition to the paste,

other substances, for example sodium persulphate, can be used.

WHAT WE CLAIM IS:—

1. A method of manufacturing a battery  
5 plate by coating a grid with a paste containing oxides and/or sulphates of lead mixed with a solution of these compounds, the method including the step of incorporating  
10 in the paste a substance which will be reduced in preference to oxygen when the paste is added to the grid.
2. A method as claimed in claim 1 in which the substance is a persulphate in proportion of less than 3% by weight.

3. A method as claimed in claim 2 in 15 which the substance is ammonium persulphate.

4. A method as claimed in claim 2 in which the substance is sodium persulphate.

5. A method of manufacturing a battery 20 plate, substantially as described.

6. A battery plate whenever manufactured by a method according to any one of claims 1 to 5.

MARKS & CLERK  
Chartered Patent Agents.  
Agents for the Applicants.